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DESCRIPTIONS OF NEW SPECIES OF *PERDITA* (HYMENOPTERA,  
APOIDEA) IN THE COLLECTION OF THE  
CALIFORNIA ACADEMY OF SCIENCES

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**ABSTRACT:** Described from the western Nearctic are 16 new species of *Perdita* bees that belong to 4 subgenera and 3 groups as follows: in the subgenera *Cockerellia* (*autumnalis* and *pachygnatha*), *Hexaperdita* (*cinctiventris*, *infuscata*, and *zavortinki*), *Perditella* (*pusillissima*), and *Perdita* (Octomaculata group—*esmeraldensis*, *inyoensis*, *medialis*, *pauliana*, and *willcoxiana*; Ventralis group—*diminutiva* and *gracillior*; and Sphaeralceae group—*apicalis*, *bifasciata*, and *perlucens*).

INTRODUCTION

The genus *Perdita* consists of mostly small, colorful bees distinguished from other genera of panurgine bees by the very short, truncate marginal cell and the short last submarginal cell in the forewings. The genus is noteworthy because of the great number of included species, several hundred being known, its relatively limited geographical distribution, most of the species being restricted to the arid western United States and Mexico, and the oligolecty shown by most species. The genus was monographed in a series of seven parts that appeared in the *University of California Publications in Entomology* (Timberlake 1954-1968).

This report is based on a collection of *Perdita* received from the Academy in the spring of 1975 and represents the accumulation of material over a period of some forty years. Four of the 16 new species are from New Mexico and the southeast-

ern part of Arizona, two from Esmeralda County, Nevada, and the remainder from California and Baja California.

SPECIES DESCRIPTIONS

Genus *Perdita* Smith

Subgenus *Cockerellia* Ashmead

*Perdita autumnalis*, new species

This species of *Cockerellia* runs in the key (Timberlake 1968: 19) to *luculenta* Timberlake, but differs in the large dark mark on the clypeus, more strongly punctured frons and in having the abdomen black with three white bands.

**FEMALE.**—Head and thorax dark green, propodeum nearly black. Mandibles, with exception of testaceous red apex, creamy white; labrum, clypeus, oblique lateral marks intruding between foveae and eye, transverse supraclypeal and rather small subantennal marks creamy white. Clypeus with large, triangular, median, black mark, narrowed above, and usually enclosing light spots. Line on collar, interrupted band on

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hind margin of pronotum and tubercles white; thorax otherwise dark. Abdomen black, with small spot on lateral margins of tergite 1 and rather narrow band on tergites 2 to 4 white. Band on tergite 2 touching lateral foveae, that on tergite 3 curved slightly backward at outer ends and reaching lateral margins, and that on tergite 4 enclosed. Pygidial plate testaceous. Legs black, apices of front and middle femora, anterior sides and bases of tibiae broadly white, and tarsal segments testaceous. Antennae dark, scape narrowly white beneath, flagellum more yellowish, but dusky above. Tegulae white at base and subhyaline on outer margin. Wings milky hyaline, nervures pallid, margins of stigma yellowish, subcosta fuscous.

Head distinctly broader than long, cheeks strongly receding and three-fourths as wide as eyes, but narrowed anteriorly. Lateral ocelli about their distance apart from margin of eyes and occipital margin. Facial foveae strongly impressed, close to margin of eyes, nearly as wide as diameter of ocelli and reaching about three-fourths of distance from level of antennal sockets to level of anterior ocellus. Antennae inserted below middle of face, slightly clavate with middle joints of flagellum about as long as thick. Antennal sockets much closer to each other than to margin of eyes. Face below level of antennae convex, with clypeus prominent, disk of clypeus as broad as high and truncate at summit. Mandibles broadly dilated on inner margin, with incurved acute apex. Proboscis much longer than head and much exceeding fossa in repose. Pterostigma as long, and about three-fourths as wide, as first submarginal cell; marginal cell longer beyond than beneath stigma, with metacarpus half longer again than apical truncation.

Head and thorax polished, frons with dense, strong, fine punctures, extending short distance below level of antennae, but clypeus with very few punctures. Punctures of mesonotum similar to those of frons but less dense, and those of mesopleura finer. Abdomen moderately shining, with dense, shallow punctures. Pubescence white, erect and rather dense on cheeks, sides and undersurface of thorax; somewhat shorter on mesonotum and still shorter on face above level of antennae. Apical fimbria of abdomen long and rather dense. Scopal hair of hind legs long, fine and very dense.

Length, 6.5–7 mm; anterior wing, 5.5 mm; width of abdomen, 2.5 mm.

**HOLOTYPE FEMALE.**—2.4 km (1.5 miles) SW of Wildrose Station, Death Valley National Monument, Inyo County, California, on *Chrysothamnus paniculatus*, 6 Nov. 1968 (P. H. Arnaud, Jr.).

**PARATYPES.**—Three females, same data as type, and 12 females, Water Canyon, Panamint Valley, Inyo County, California, 701 m (2300 ft), on same flower, 7 Nov. 1968 (P. H. Arnaud, Jr.).

Types in collection of the California Academy of Sciences, San Francisco, and two paratypes in collection of the University of California, Riverside.

### ***Perdita pachygnatha*, new species**

In the key to *Cockerellia* (Timberlake 1954: 386), the female falls in the group of species separated in couplets 21 to 24, agreeing best with "*albipennis*," now called *lingualis* Cockerell, in sculpture and markings but differing from other species of *Cockerellia* in the short, broad mandibles with usual incurved apical part very short.

**FEMALE.**—Head and thorax dark green, with propodeum more bluish. Mandibles, with exception of reddish tips, black; labrum, broad median part of clypeus and supraclypeal area black; lateral third of clypeus, transverse lateral marks (somewhat widened on orbits), tubercles, and narrow, interrupted band on hind margin of pronotum, creamy white. Abdomen black, with broad white band on tergites 2 to 4, curved backward at outer ends and reaching lateral margins on 2 and 3, shorter and straighter on 4, narrowly interrupted on 3 and 4, and moderately widely interrupted on tergite 2. Pygidial plate ferruginous. Legs black with small joints of tarsi somewhat reddish. Antennae black, flagellum broadly dark reddish ferruginous beneath. Tegulae testaceous, with white spot at base. Wings whitish subhyaline, nervures and stigma testaceous.

Head as broad as long, with cheeks strongly receding; nearly as broad as eyes; lateral ocelli about their distance apart from margin of eyes and somewhat closer to occipital margin. Facial foveae well impressed, very close to margin of eyes and reaching about two thirds of way from level of antennal sockets to level of anterior ocelli. Antennae inserted just below middle of face, with flagellum moderately clavate, with middle joints about as long as thick. Face below level of antennae strongly convex from side to side, with clypeus very prominent. Mandibles robust, hardly reaching beyond median line of head, with usual incurved apical part very short. Proboscis short, retracted in holotype, with apex of galeae reaching base of stipites. Pterostigma about half

as wide as first submarginal cell; marginal cell somewhat longer beyond than beneath stigma, with metacarpus more than twice as long as apical truncation. Pygidial plate about as long as wide at base, with side converging to rather narrow, rounded apex.

Head and thorax shining, finely punctured. Frons very minutely tessellate, with fine punctures, about a puncture width apart, but leaving impunctate space in front of ocelli. Punctures of clypeus somewhat coarser and well separated, and those of mesoscutum also coarser and moderately dense. Mesopleura minutely tessellate, with fine separated punctures. Pubescence white, moderately long and dense on cheeks and thorax, and thinner on face. Apical fimbria of abdomen long but thin. Hair of legs white and abundant, with scopal hair of hind legs very long, fine and dense.

Length, 6 mm; anterior wing, 4.5 mm; width of abdomen, 2.2 mm.

**HOLOTYPE FEMALE.**—2.4 km (1.5 miles) SW of Wildrose Station, Death Valley National Monument, Inyo County, California, 953 m (3100 ft), at flower of *Chrysothamnus paniculatus*, 6 Nov. 1968 (P. H. Arnaud, Jr.).

Type in collection of the California Academy of Sciences, San Francisco.

### Subgenus *Hexaperdita* Timberlake

#### *Perdita cinctiventris*, new species

This species of *Hexaperdita* would fall with the species separated in couplets 22 to 25 in the key (Timberlake 1956: 249) and can be distinguished from *foveata* Timberlake, *graenicheri* Timberlake, *bishoppi* Cockerell, and *boltoniae* (Robertson) by having the face entirely dark and the light bands of the abdomen entire.

**FEMALE.**—Head and thorax dark green without markings, except tubercles and anterior border of pronotum white. Abdomen black, with broad, entire, yellowish-white band at base of tergites 2 to 5, that on tergite 2 touching lateral foveae, others not quite reaching lateral margins; tergite 1 with two small white spots, close together at summit of basal declivity. Legs entirely dark. Antennae dark, flagellum brownish beneath. Tegulae testaceous. Wings dusky hyaline, nervures dark, disk of stigma yellowish.

Head moderately broader than long; cheeks receding, about three-fourths as wide as eyes. Lateral ocelli slightly farther apart than their distance from margin of eyes. Facial foveae well impressed, and close to margin of eyes, about

four times longer than wide, and reaching about three-fourths of distance from level of antennal sockets to level of anterior ocellus. Antennae inserted below middle of face, with flagellum clavate and middle joints broader than long. Face depressed, with clypeus gently convex, its disk broader than long and rounded at summit. Mandibles reaching for margin of labrum, parallel sided and evenly rounded at apex. Proboscis moderately long, galeae shorter than stipites. Pterostigma about three-fourths as wide as first submarginal cell, emitting radius at middle; marginal cell longer beyond than beneath stigma, with metacarpus somewhat less than twice as long as apical truncation. Pygidial plate with moderately wide rounded apex. Tarsal claws simple.

Frons and vertex minutely tessellate, rather dull, and with very fine close punctures on frons and sides of face below antennae; punctures of clypeus coarser and moderately close. Mesoscutum delicately tessellate, shining, with fine punctures widely separated on posterior half, and moderately close anteriorly and on scutellum. Mesopleura minutely tessellate, with fine separated punctures. Abdomen dullish, minutely tessellate and with fine distinct punctures. Pubescence white, that on face short, erect, and moderately dense, and that on cheeks and thorax longer; hair of scutum thin, except on anterior border, and more than twice as long as diameter of ocelli. Apical fimbria of abdomen rather long and dense. Scopal hair of hind tibiae fine and simple and not greatly longer than width of tibia.

Length, about 5 mm; anterior wing, 3 mm; width of abdomen, 1.5 mm.

**HOLOTYPE FEMALE.**—Martinez, Contra Costa County, California, 11 Sep. 1966 (R. M. Brown).

**PARATYPE.**—One female, same data as type.

Types in collection of the California Academy of Sciences, San Francisco.

#### *Perdita infuscata*, new species

This is the fifth *Hexaperdita* recorded from Baja California. The female runs to *foveata* Timberlake in the key but differs in the dusky wings with dark nervures, and more nearly polished mesoscutum with scattered fine punctures, and in the shorter marginal cell, as well as in the lack of light markings.

**FEMALE.**—Head and thorax dark green and abdomen black, without light markings except tubercles white, and anterior margin of pronotum

very narrowly whitish. Legs dark, with anterior side of front tibiae yellowish. Scape and pedicel of antennae black, flagellum more fuscous. Tegulae dark testaceous. Wings dusky hyaline, nervures and margins of stigma fuscous.

Head somewhat broader than long; cheeks strongly receding, about one-third as wide as eyes. Posterior ocelli very slightly closer to each other than to margin of eyes or occipital margin. Antennae inserted below middle of face, with flagellum moderately clavate and joints mostly about as wide as long. Facial foveae oval, very close to margin of eyes, about three times longer than wide and about half as long as space between level of antennae and anterior ocellus. Face below level of antennae gently convex, with disk of clypeus broader than high and rounded at summit. Mandibles and proboscis concealed in holotype. Pterostigma as long and as wide as first submarginal cell; marginal cell equal beneath and beyond stigma with metacarpus about one-fourth longer than apical truncation. Pygidial plate concealed in holotype, apparently rather narrowly rounded at apex.

Frons very minutely granular tessellate, dull and minutely punctured to level of ocelli. Face below level of antennae more shining and rather closely and finely punctured. Mesoscutum obscurely tessellate, shining and with scattered fine punctures; scutellum with coarser dense punctures, and mesopleura shining, with separated punctures.

Pubescence fine, short and thin on face and mesoscutum, and denser and longer on cheeks. Abdomen depressed, short, widest on third segment, with short, thin hair fringing lateral margin of tergites 2 to 4, and apical fimbria on tergites 5 and 6 moderately dense and long. Hind tibiae narrow, with scopal hair fine and nearly twice as long as width of tibia.

Length, 4.5 mm; anterior wing, 3.0 mm; width of abdomen, 1.5 mm.

**HOLOTYPE FEMALE.**—17.6 km (11 miles) W of Santo Tomas, Baja California Norte, Mexico, 137 m (450 ft), 11 Jul. 1969 (S. C. Williams and V. F. Lee).

Type in collection of the California Academy of Sciences, San Francisco.

### *Perdita zavortinki*, new species

(Figures 1 and 2.)

This little species of *Hexaperdita* is closely allied to *heterothecae* Cockerell, with the clypeus mainly black, the lateral marks triangular and

reaching facial foveae, and abdomen black with small transverse white mark on each side of the third tergite. In the male the clypeus and transverse lateral marks are white and the abdomen dark.

**FEMALE.**—Head and thorax dark blue-green, clypeus and supraclypeal area black, with lateral marks triangular and intruding acutely between foveae and margin of eyes, and small contiguous spot on each side of clypeus mainly on lateral extensions white. Thorax dark except tubercles white. Abdomen black, with small transverse white mark on each side of tergite 3. Pygidial plate testaceous. Legs black, extreme apex of femora, anterior side of front and middle tibiae and their tarsi yellowish white. Antennae fuscous, scape white beneath, and flagellum yellowish brown beneath. Labrum and mandibles testaceous, latter white at base. Tegulae testaceous. Wings somewhat whitish hyaline, nervures testaceous, margins of stigma and subcosta more brownish.

Head broader than long; cheeks slightly receding, about two-thirds as wide as eyes. Posterior ocelli approximately their distance apart from margin of eyes and occipital margin. Facial foveae strongly impressed, about half their own width from margin of eyes and reaching from level of antennal sockets about two thirds of distance to level of anterior ocellus. Antennae slightly clavate with middle joints of flagellum as long as thick. Disk of clypeus gently convex, much broader than high, and rounded on summit. Proboscis moderately long, galeae about equal to stipites. Pterostigma three-fourths as wide as first submarginal cell; marginal cell slightly shorter beneath than beyond stigma, with metacarpus one-half longer again than apical truncation. Pygidial plate narrow at apex.

Head and thorax shining, almost impunctate, frons finely tessellate and mesonotum polished. Pubescence whitish, fine, erect and thin, with face and mesonotum nearly bare.

Length, 4 mm; anterior wing, 2.9 mm; width of abdomen, 0.9 mm.

**MALE.**—Head and thorax dark blue-green, mandibles, with exception of refotestaceous apical third, white; clypeus and transverse lateral marks reaching no higher than summit of clypeus, white. Labrum more tinged with testaceous. Thorax entirely dark. Abdomen blackish without markings. Legs dark, apex of femora, anterior side of front tibiae, bases of middle

and hind tibiae on anterior sides, and all tarsi white. Antennae dark, scape white beneath. Tegulae testaceous. Wings whitish hyaline, nervures pallid.

Head much broader than long; cheeks strongly receding, nearly as broad as eyes. Occipital concavity, as seen from above and behind, shallow and about one-half as wide as greatest width of head at level of upper part of eyes. Posterior ocelli about their distance apart from margin of eyes and occipital margin. Facial foveae linear, about three times longer than wide. Antennae inserted much below middle of face, antennal sockets about their distance apart from margin of eyes. Disk of clypeus broader than high and broadly rounded at summit. Proboscis and wing venation as in female.

Head and thorax smooth and shining, anterior half of frons with very minute close punctures, mostly absent on upper half. Vertex minutely tessellate, duller than frons, and impunctate. Mesoscutum delicately and minutely tessellate, with fine, sparse punctures, and mesopleura similar but more closely punctured. Pubescence longer and denser than in female, erect and moderately long on cheeks and sides of thorax, and thinner on face, and mesonotum. Hair of legs longest and densest on front femora, and hair of hind tibiae fine and somewhat longer than greatest width of tibia. Abdomen depressed, with very short fine hair on apical segments. Subgenital plate very similar to that of *heterothecae* (Timberlake 1956: Fig. 298), and genital armature as figured here.

Length, about 3.5 mm; anterior wing, 2.9 mm; width of abdomen, 0.8 mm.

HOLOTYPE FEMALE AND ALLOTYPE MALE.—0.8 km (0.5 miles) NE of Apache, Cochise County, Arizona, resting on ground, 30 Aug. 1972 (T. J. Zavortink).

Types in collection of the California Academy of Sciences, San Francisco.

### Subgenus *Perditella* Cockerell

#### *Perdita pusillissima*, new species

This is a new species of *Perditella*, allied to *P. minima* Cockerell and similar in color but marked with black. As there is only one male, dissection of the terminalia for illustration was not attempted.

FEMALE.—General color testaceous, similar to that of *minima* but with a subquadrate black mark on each side of posterior part of mesosternum. In paratype, large mark on frons, vertex

and anterior part of mesoscutum also black. Antennae and legs testaceous, but flagellum dusky, more so in paratype. Tegulae testaceous. Wings whitish hyaline, nervures pallid.

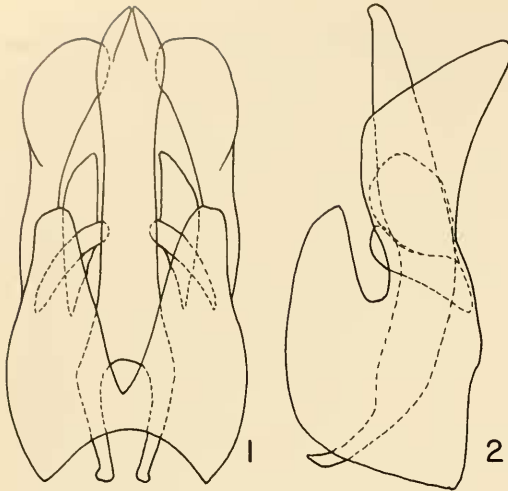
Head rotund, as broad as long; cheeks moderately receding, about half as wide as eyes. Facial foveae hardly more than twice as long as wide, and somewhat wider than interval between them and margin of eyes. Antennae inserted below middle of face, scape slender, not reaching ocelli, flagellum slightly clavate, with middle joints about as long as thick. Face below level of antennae gently convex. Mandibles tapering, acute. Proboscis moderately elongate, galeae about equal to stipites. Pterostigma large, wider than first submarginal cell, evenly rounded within; marginal cell in large part beneath stigma, with metacarpus about half as long as apical truncation. Second submarginal cell narrowed above, with nervures meeting or almost meeting where joining radius, the second strongly curved.

Head and thorax shining, smooth and impunctate, with very short, thin, erect pubescence on cheeks, occiput, anterior part of scutum, and underpart of thorax. Scopal hair of hind legs thin and only slightly longer than greatest width of tibia.

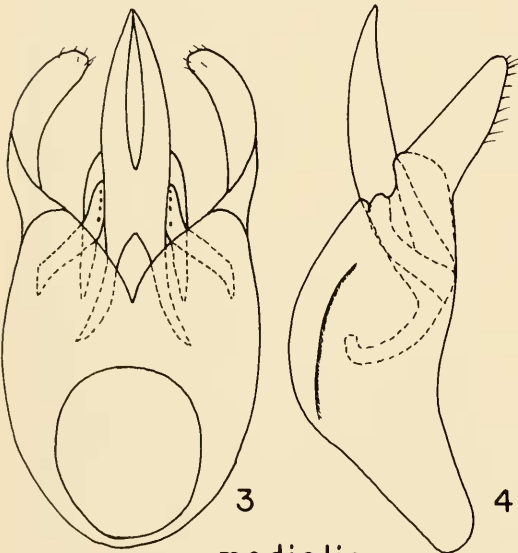
Length, 3.75 mm; anterior wing, 2.4 mm; width of abdomen, 6.8 mm.

MALE.—Testaceous, with vertex, mesonotum and mark on each side of posterior part of mesosternum black. Antennae and legs testaceous. Wings whitish hyaline, with pallid nervures.

Head subquadrate, as long as wide, distinctly wider than thorax, broadened in front, with inner orbits diverging anteriorly; cheeks nearly as wide anteriorly as eyes but much wider behind, and with small triangular laminate process anteriorly. Eyes rather small, on anterior two thirds of head. Occiput with semicircular emargination, about half as wide as width of head at summit of eyes. Posterior ocelli somewhat less than twice their distance apart from margin of eyes and occipital margins. Facial foveae punctiform, close to margin of eyes, at two thirds of length of eyes from anterior end. Antennae inserted well below middle of face, scape slender, flagellum weakly clavate, reaching level of base of wings, with joints about as long as thick. Clypeus convex, prominent, rounded above, with two porrect processes on anterior border, about half as long as interval between their bases. Mandibles gently and convexly curved, tapering to very acute apex



zavortinki



medialis

FIGURES 1-4. Dorsal and lateral views of male genitalia of *Perdita*. Figs. 1-2, *P. zavortinki*; Figs. 3-4, *P. medialis*.

and reaching to base of each other. Proboscis and vertex as in female.

Head and thorax shining, impunctate, with extremely minute and delicate tessellation on face. Pubescence very thin and short, with face, cheeks and mesonotum bare.

Length, 3.2 mm; anterior wing, 2.3 mm; width of abdomen, 0.6 mm.

HOLOTYPE FEMALE AND ALLOTYPE MALE.—1.6 km (1 mile)

NE of Portal, Cochise County, Arizona, on *Baccharis*, 3 Aug. 1972 (T. J. Zavortink).

PARATYPE.—One female taken with types.

Types in collection of the California Academy of Sciences, San Francisco.

### Subgenus *Perdita* Smith

#### OCTOMACULATA GROUP

#### *Perdita esmeraldensis*, new species

This species falls in the keys (Timberlake 1960: 10; 1968: 65) near *ensenadensis* Timberlake and *sejuncta* Timberlake. It is most similar to *ensenadensis* but differs in the pattern of abdominal markings and in having the pygidial plate finely notched at apex.

FEMALE.—Head and thorax dark green, labrum and dark part of face below level of antennae black. Mandibles at base creamy white, shading through testaceous to red at apex; median oval mark on clypeus pointed above, and lateral marks, filling space between margin of eyes and clypeus, creamy white, remaining anterior border of face dark (rather broadly) on each side. Tubercles white, but pronotum otherwise dark. Abdomen black, with white bands on tergites 1 to 5, reduced to well separated marks on tergite 1, interrupted narrowly on tergites 2, 3 and 5, but entire on 4; touching full width of lateral foveae and narrowed medially on tergite 2, ending close to lateral margin of segments on tergites 3 and 4, with that on tergite 5 more enclosed. Venter dark, but sternite 6 and pygidial plate testaceous and sternite 5 tinged with testaceous apically. Legs black, with extreme apex of front and middle femora, anterior side of their tibiae and tarsi, and hind knees white. Scape of antennae black, flagellum fuscous, becoming yellowish brown beneath. Tegulae testaceous. Wings somewhat opaquely subhyaline, nervures and margins of stigma testaceous.

Head somewhat broader than long; cheeks rounded, moderately receding and half as wide as eyes. Posterior ocelli about their distance apart from occipital margin and somewhat more distant from margin of eyes. Facial foveae slender, about half their width from margin of eyes and reaching about halfway from level of antennal sockets to level of anterior ocellus. Antenna inserted below middle of face, moderately clavate, with middle joints of flagellum somewhat thicker than long. Face below level of antennae convex from side to side, with disk of clypeus considerably broader than high and rounded at summit. Mandibles ta-

pering and acute. Proboscis retracted in holotype and slightly exceeding proboscoidal fossa. Pterostigma half as wide as first submarginal cell; marginal cell longer beyond than beneath stigma, with metacarpus about one-third longer again than apical truncation. Pygidial plate with small notch at apex.

Frons and vertex very minutely granular, dull and impunctate, with face below level of antennae shining and obscurely punctured. Mesoscutum like frons, but slightly less minutely granular tessellate. Mesopleura and propodeum very minutely tessellate and shining. Pubescence fine, erect, whitish, rather dense and about twice as long as diameter of ocelli on cheeks, slightly shorter and less dense on mesonotum, and longer on underside of thorax. Apical fimbria of abdomen long and thin. Scopal hair of hind legs fine, obliquely inclined and somewhat longer than greatest width of tibia.

Length, 5 mm; anterior wing, 2.6 mm; width of abdomen, 1.3 mm.

**HOLOTYPE FEMALE.**—Lida, at summit, 2255 m (7400 ft), Esmeralda County, Nevada, 15 Jul. 1966 (P. H. Arnaud, Jr.).

Type in collection of the California Academy of Sciences, San Francisco.

#### *Perdita inyoensis*, new species

This is a mainly dark species from the Angus Mountains. The specimens are in rather poor condition for study; they appear to agree best with the Octomaculata Group. In the key (Timberlake 1960: 4), it runs out at *polygonellae* Timberlake but the abdomen is black with the middle segments translucent reddish.

**FEMALE.**—Head and thorax very dark green, with dark part of face below level of antennae and mesonotum black. Mandibles, with exception of reddish tips, creamy white; median stripe on clypeus, triangular lateral marks (broad in front, about twice as long as wide and ending acutely at anterior end of foveae, with slight extension between foveae and margin of eyes), tubercles and small spot on each side of hind margin of pronotum creamy white. Abdomen black, with middle segments translucent reddish, and with faint nubilous whitish mark on disk of tergite 1 extending forward onto basal declivity. Antennae and legs dark, but apex of front femora, anterior side of front tibiae and front tarsi pale yellow. Wings somewhat whitish hyaline, nervures testaceous. Tegulae testaceous.

Head about as long as wide, with cheeks half as

wide as eyes and receding. Posterior ocelli somewhat closer to margin of eyes and occipital margin than their distance apart. Facial foveae well impressed, about four times longer than wide, close to margin of eyes, and reaching from lower level of antennal sockets about three-fourths of distance to level of anterior ocellus. Antennae mainly missing, but scape slender, of normal length. Face below level of antennae gently convex from side to side, with disk of clypeus as broad as high and rounded at summit. Mandibles tapering and acute. Proboscis moderately long, galeae shorter than stipites. Pterostigma three-fourths as wide as first submarginal cell; marginal cell slightly longer beneath than beyond stigma, with apical truncation and metacarpus equal. Pygidial plate nearly concealed in holotype, but very narrow at apex.

Head and thorax dullish, minutely tessellate, with minute punctures between foveae and antennal sockets and a few minute punctures on anterior border of mesoscutum. Face below level of antennae polished and impunctate. Pubescence whitish, fine, thin and erect, with only a few hairs on anterior border of scutum, but front coxae with dense white hair.

Length, about 5 mm; anterior wing, 3.5 mm; width of abdomen, 1.3 mm.

**HOLOTYPE FEMALE.**—Angus Mountains, Inyo County, California, 12 May 1948 (E. R. Leach).

**PARATYPE.**—One female taken with the type.

Types in collection of the California Academy of Sciences, San Francisco.

#### *Perdita medialis*, new species

(Figures 3 and 4.)

The female of *medialis* has the face below level of antennae white, with a large bilobed dark mark, partly on the clypeus. In the key (Timberlake 1960: 10, 19) to the Octomaculata Group, *medialis* runs to *swenki* Crawford but differs by the black mark on the face, by the light pronotum with dark band from flank to flank, and by the pale yellow legs.

**FEMALE.**—Head and thorax dark green, mandibles, with exception of reddish apical third, creamy white; labrum and face below level of antennae creamy white, lateral marks ending broadly at level of antennae. Large mark on each side of upper half of clypeus (interval nearly as wide as marks and moderately narrowed above) and supraclypeal area intruding roundly between antennae black, with subantennal plates slightly

greenish. Pronotum white, with green band from flank to flank. Abdomen pale yellow, with small spot on lateral margins of tergite 1 at summit of basal declivity, and narrow band at junction of tergites 1-2 to 4-5 black, with that portion of bands at apex of segments obliquely narrowed at outer ends, and part at base of segments produced into short curved spur at outer ends on tergites 3 and 4, and that on tergite 2 confluent at outer ends with black lateral foveae. Tergite 6 testaceous. Legs pale yellow, with hind coxae except at apex, hind tibiae except at base, and hind tarsi fuscous, and middle tibiae dusky behind. Antennae fuscous, scape broadly pale yellow beneath and flagellum dull yellowish beneath. Tegulae whitish, with subhyaline spot on outer margin. Wings whitish hyaline with pale testaceous nervures and stigma.

Head slightly longer than wide, cheeks receding, about half as wide as eyes. Posterior ocelli closer to margin of eyes and occipital margin than their distance apart. Facial foveae very slender, close to margin of eyes, and reaching about two thirds of distance from level of antennal sockets to level of anterior ocellus. Antennae normal for group, with middle joints of flagellum as long as wide. Face below level of antennae gently convex, clypeus rounded at summit, with lateral extensions broadly inflexed. Mandibles tapering and acute. Proboscis moderately elongate, galeae about equal to stipites. Pterostigma hardly more than half as wide as first submarginal cell; marginal cell longer beyond than beneath stigma, with metacarpus nearly twice as long as apical truncation. Pygidial plate about as long as wide at base, with slightly crenate sides converging to rounded and slightly retuse apex.

Frons and vertex very minutely granular, matt and obscurely punctate. Face below level of antennae smooth, shining and impunctate. Mesonotum minutely tessellate, densely and very finely punctured and more shining than frons. Mesopleura shining, minutely tessellate and with close minute punctures. Propodeum tessellate and shining with minute dense punctures on lateral ridges. Pubescence whitish, fine, erect, rather long on cheeks and sides of thorax, and short, erect on anterior part of frons, and short, erect and yellowish and rather dense on scutum and scutellum, but face below antennae bare. Apical fimbria of abdomen long and rather dense. Scopal hair of hind tibiae normal for group.

Length, 6 mm; anterior wing, 4 mm; width of abdomen, 1.8 mm.

MALE.—Head and thorax dark green, marked with yellow, probably pale, but reddened by cyanide in allotype. Mandibles, except tips, labrum and face to level of foveae yellow; underside of head, hypostoma, walls of proboscis fossa and very narrow postorbital orbits to middle of eyes also light. Pronotum mainly yellow, including tubercles, but with broad dark band descending on flank, with posterior spur at outer ends protruding narrowly to inferior margin of tubercles. Abdomen yellow with base of tergite 1 and band at junction of segments black; first two bands narrow but wider on following segments with yellow on tergite 5 enclosed; tergite 6 black, with very narrow, abbreviated and interrupted yellow band; tergite 7 also black, yellow on apical lobe, and venter uniformly yellow. Legs yellow, narrow line behind on inferior margin of front femora and tibiae, broader marks behind on middle femora and tibiae, hind femora beneath, hind tibiae (except in front) and hind tarsi fuscous. Antennae yellow, pedicel black above and flagellum dusky. Tegulae testaceous. Wings subhyaline, nervures testaceous.

Head somewhat broader than long; cheeks but little receding, rounded and three-fourths as wide as eyes. Posterior ocelli slightly more than their distance apart from margin of eyes and occipital margins. Antennae inserted slightly below middle of face, scape about four times longer than thick, flagellum slightly clavate, with middle joints as long as thick. Face below level of antennae gently convex from side to side, with disk of clypeus broader than high and truncate at summit. Mandibles acute and reaching somewhat beyond far margin of labrum. Proboscis briefly exceeding proboscis fossa. Venation as in female.

Frons minutely granular, dull and impunctate. Face below level of antennae moderately shining and impunctate. Mesonotum dull, very minutely tessellate and obscurely punctured. Mesopleura shining and minutely punctured. Abdomen elongate oval, depressed, with apical tergite narrowly rounded at apex. Pubescence whitish, fine, moderately long, and of usual density on cheeks and underside of thorax, very short and thin on face, and thin, erect and short on mesoscutum. Terminalia as figured.

Length, 6 mm; anterior wing, 4 mm; width of abdomen, 1.5 mm.



**HOLOTYPE FEMALE AND ALLOTYPE MALE.**—Gran Quivira, Torrance County, New Mexico, 1,981 m (6500 ft), 18–20 Aug. 1967 (H. B. Leach).

**PARATYPES.**—Two females, same data as for types.

Types in collection of the California Academy of Sciences, San Francisco, except one paratype in collection of the University of California, Riverside.

***Perdita pauliana*, new species**

(Figures 5, 6, 7.)

This species is closely allied to *swenki* Crawford and *aridella* Timberlake, near which it runs in the key (Timberlake 1960: 19, 20) to the *Octomaculata* Group. It differs in having the clypeus mainly yellow, and the light bands about equal to the dark intervals, and enclosed on tergites 1 to 5, with last two segments nearly all yellow. The head in the type-specimen is moderately enlarged and subquadrate.

**MALE.**—Head and thorax dark green. Gular region, inferior orbits on anterior fourth of eyes, mandibles except red tips, labrum and anterior half of face to level of foveae, clear yellow. Thorax dark, except collar narrowly; transverse mark on each side of hind margin of pronotum, and small spot on tubercles yellow. Abdomen yellow, with band at base of tergite 1 and band at junction of segments 1–2 to 5–6 fuscous, with light bands equal to dark intervals and almost reaching lateral margins, very uniform in width with median notch behind on tergites 1 to 4. Dark banding on two apical segments subobsolete. Front legs yellow, with femora black behind except at apex; middle legs dark, with apex of femora, tibiae and tarsi yellow, and hind legs dark with knees yellow. Antennae yellow, spot at apex of scape above and pedicel black, and flagellum brownish above. Tegulae fuscous. Wings hyaline, nervures testaceous, margins of stigma and subcosta brownish.

Head moderately enlarged, subquadrate, broader than long and broader than thorax. Cheeks slightly receding, about as wide as eyes. Posterior ocelli about their distance apart from occipital margin but closer to margin of eyes. Facial foveae small, twice as long as wide, situated close to margin of eyes and somewhat below halfway point between levels of antennal sockets and anterior ocellus. Antennae inserted below middle of face, moderately clavate, with middle joints of flagellum as long as thick. Face below level of antennae rather strongly convex with disk of clypeus as broad as high, nearly truncate at summit, and lateral extensions

broadly inflexed and only partly visible in frontal aspect. Mandibles simple and reaching far margin of labrum. Proboscis retracted in holotype and somewhat exceeding proboscoidal fossa. Pterostigma about half as wide as first submarginal cell; marginal cell about equal beneath and beyond stigma, with metacarpus distinctly longer than apical truncation.

Frons and vertex very dull and impunctate, and face below antennae shining with faint, sparse punctures. Mesonotum tessellate, dull, but more shining than frons, and with fine, moderately close, obscure punctures. Mesopleura more shining than notum, finely and sparsely punctured. Pubescence white, rather short, erect and dense on cheeks, very short and thin on face above antennae, and short, erect and thin on mesonotum.

Abdomen depressed, with apical segment provided medially with narrow obtuse lobes. Subgenital plate and genital armature as figured (Figs. 5–7).

Length, about 4.5 mm; anterior wing, 3.0 mm; width of abdomen, 1.6 mm.

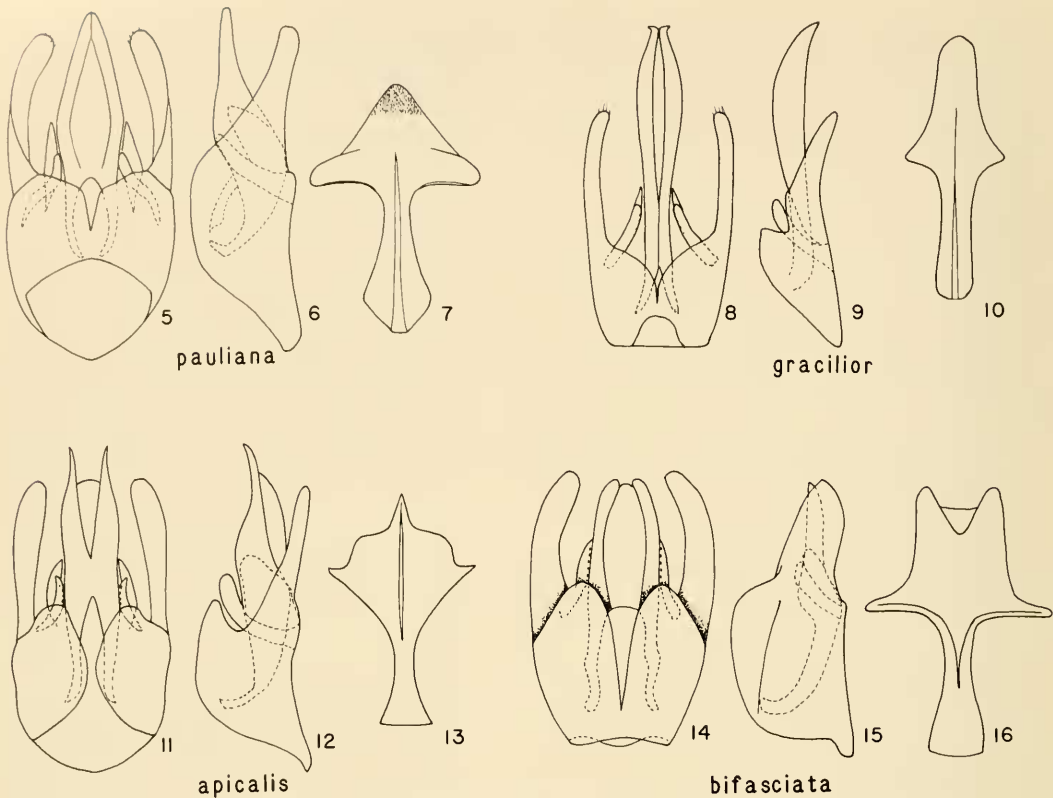
**HOLOTYPE MALE.**—Lida, at summit, Esmeralda County, Nevada, 2255 m (7400 ft) 15 Jul. 1966 (P. H. Arnaud, Jr.).

Type in collection of the California Academy of Sciences, San Francisco.

***Perdita willcoxiana*, new species**

This species of the *Octomaculata* Group runs to the three species separated in couplets 73–74 of the key (Timberlake 1960: 9–10), and agrees best with *cazieri* Timberlake, but differs in having the clypeus mainly black, with a median stripe, and the lateral marks small and transverse.

**FEMALE.**—Head and thorax dark green, more bluish on propodeum, with dark part of clypeus and supraclypeal area black. Median stripe on clypeus, dilated anteriorly, very narrow lateral margin of disk and small lateral mark between clypeus and eyes creamy white. Tubercles and in some cases small spot on each side of hind margin of pronotum also white. Abdomen black with narrow white band on tergites 1 to 4, narrowly interrupted medially, curved backward at outer ends and reaching lateral margins on tergites 2 and 3, somewhat abbreviated on tergite 4 and that on tergite 1 in some cases divided into four transverse marks. Legs black, extreme apex of front femora, anterior side of front and middle tibiae and front tarsi pale yellow. Mandibles white except red at apex. Antennae dark, but radicle joint



FIGURES 5-16. Dorsal and lateral views of male genitalia, and subgenital plate of *Perdita*. Figs. 5-7, *P. pauliana*; Figs. 8-10, *P. gracilior*; Figs. 11-13, *P. apicalis*; Figs. 14-16, *P. bifasciata*.

of scape white, and flagellum yellowish beneath. Tegulae testaceous. Wings slightly whitish hyaline, nervures testaceous, margins of stigma and subcosta more brownish. Pygidial plate testaceous.

Head as broad as long, cheeks receding, about half as wide as eyes. Posterior ocelli somewhat closer to margin of eyes and occipital margin than their distance apart. Facial foveae narrow, close to margin of eyes and reaching about halfway from level of antennal sockets to level of anterior ocellus. Antennae normal for group, with middle joints of flagellum about as long as thick. Face below level of antennae gently convex, with disk of clypeus somewhat broader than high and subtruncate at summit. Mandibles simple and acute. Proboscis moderately elongate, with galeae equal to stipites. Pterostigma hardly more than half as wide as first submarginal cell; marginal cell about as long as stigma, with parts beneath and beyond stigma equal, and metacarpus distinctly longer

than apical truncation. Abdomen depressed, about three times longer than wide, with pygidial plate notched at apex.

Frons and vertex very minutely granular, dull, and impunctate except close to base of antennae. Face below level of antennae more shining, with shallow obscure punctures on clypeus. Mesonotum minutely tessellate, more shining than frons, and with minute close punctures. Pubescence white, short, erect, thin on face and abundant on mesonotum. Scopal hair of hind tibiae distinctly longer than greatest width of tibia.

Length, about 6 mm; anterior wing, 3.7 mm; width of abdomen, 1.5 mm.

**HOLOTYPE FEMALE.**—Willcox Dry Lake, Cochise County, Arizona, 17 Sep. 1969 (B. A. Tilden).

**PARATYPE.**—Three females taken with the holotype.

Types in collection of the California Academy of Sciences, San Francisco, except one paratype in collection of the University of California, Riverside.

## VENTRALIS GROUP

***Perdita diminutiva*, new species**

This is an isolated diminutive member of the Ventralis Group, difficult to place in any particular section of the group, but the concave sides of the face are suggestive of the claypolei section. In the key to the group (Timberlake 1962: 13) it probably runs best to couplet 100 where it can be distinguished by the yellow color of its face below level of antennae and by the dark thorax and abdomen. The minute terminalia were lost in dissection, but the genital armature was similar to that in Figure 771 (op. cit.), and I believe that the subgenital plate was wide at apex and notched.

**MALE.**—Head and thorax dark green. Mandibles, with exception of reddened extreme apices, yellow; labrum and face below level of antennae, yellow, with very broad parocular parts extending bluntly to level of foveae. Thorax dark, except tubercles yellow, and abdomen dark without markings. Legs dark, except front tibiae and tarsi yellow. Antennae yellow, with flagellum fuscous above, but streaked with yellow at juncture of joints. Tegulae dark testaceous. Wings dusky hyaline, nervures fuscous.

Head subquadrate, as broad as long, and broader than thorax. Cheeks very broad, receding slightly, rounded, but narrowed anteriorly and not dentate. Posterior ocelli about their distance apart from occipital margin and twice as far from margin of eyes. Facial foveae very obscure. Antennae inserted just below middle of face, and reaching level of anterior ocellus at juncture of second and third flagellar joints; scape very thick, only slightly longer than wide; flagellum thick, cylindrical, except narrowed slightly at base, with joints mainly thicker than long. Supraclypeal area and subantennal plates mainly equal in size and together equal to parocular area on each side of face, with median part ridged and parocular areas shallowly concave. Disk of clypeus about twice as broad as high, with lateral extension gradually narrowed to base of mandibles. Labrum twice as broad as long. Mandibles tapering from base to acute apex and reaching far margin of labrum. Proboscis short, galeae shorter than stipites. Pterostigma about half as wide as first submarginal cell; marginal cell nearly equal beneath and beyond stigma, with metacarpus slightly longer than apical truncation.

Frons and vertex very minutely granular tessellate, obscurely punctured and dull; yellow part

of face shining and impunctate. Mesonotum delicately tessellate, shining and with widely scattered minute punctures. Mesopleura shining, tessellate and sparsely punctured. Pubescence whitish, short, erect, fine and thin, most evident on cheeks, sides of thorax and anterior border of scutum, with face bare. Hind tibiae increasing gradually in width from narrow base to apex, with fine sparse, semi-erect hairs about equaling greatest width.

Length, 5 mm; anterior wing, 2 mm; width of abdomen and head, 0.9 mm.

**HOLOTYPE MALE.**—Agua Caliente (San Carlos), 18.5 km (11.5 miles) E of Maneadero, Baja California, Mexico, 6 Jul. 1973 (P. H. Arnaud, Jr.).

Type in collection of the California Academy of Sciences, San Francisco.

***Perdita gracilior*, new species**

(Figures 8, 9, 10.)

This little species from Baja California evidently belongs in the Ventralis Group and probably is as closely related to *exilis* Timberlake as to any other species, but differs greatly in sparsity of markings. In the key to group (Timberlake 1962: 2–14), the male runs near *semicrocea* Cockerell and the female runs with some discrepancy near *exilis* but is entirely dark blue or black without markings.

**FEMALE.**—Head and thorax very dark blue, clypeus, supraclypeal area and mesonotum black; abdomen black and testaceous beneath; pygidial plate ferruginous. Light marking entirely absent. Legs dark, with apex of front femora, front tibiae and all tarsi yellowish white. Antennae dark, flagellum brownish but whitish beneath. Tegulae pale testaceous. Wings whitish hyaline, nervures pallid, stigma yellowish, its margins and apical half of costal nervure infuscated. Mandibles yellowish white, red at apex.

Head slightly broader than long, with cheeks strongly receding, somewhat more than half as wide as eyes. Lateral ocelli about their distance apart from margin of eyes and from occipital margin. Facial foveae well impressed, about three times as long as wide and close to margin of eyes, and about half as long as space between antennal sockets and anterior ocellus. Antennae inserted just below middle of face, with scape reaching hardly more than halfway to level of anterior ocellus; flagellum moderately clavate, with middle joints slightly thicker than long. Face below level of antennae gently convex, with fa-

cial sutures indistinct. Mandibles parallel sided, subacute at apex. Proboscis rather short, galeae shorter than stipites. Pterostigma about as long and wide as first submarginal cell; marginal cell much longer beneath than beyond stigma, with metacarpus shorter than apical truncation. Pygidial plate longer than wide with sides converging to narrowly rounded apex; disk flat.

Head and thorax shining; face below level of antennae and mesonotum polished, mainly impunctate; frons very minutely tessellate, with minute obscure punctures in area between foveae and antennal sockets. Pubescence whitish, fine and short, few short erect hairs visible on margins of scutum. Apical fimbria rather long but thin. Scopal hair of hind legs about as long as greatest width of tibia.

Length, 5 mm; anterior wing, 3.6 mm; width of abdomen, 1.5 mm.

MALE.—Head and thorax very dark blue, with mesonotum black. Anterior margin of clypeus mainly white, and mandibles white, but reddened at apex. Abdomen black, apical segment and venter testaceous, but abdomen sometimes all testaceous except basal tergite, or apical segment more ferruginous. Legs black, apex of front femora, front tibiae and all tarsi yellowish white. Scape black, narrowly yellowish beneath, flagellum fuscous and yellowish brown beneath. Wings whitish hyaline, nervures pallid.

Head rotund, slightly broader than long; cheeks strongly receding, about half as wide as eyes and with small anterior conical process about as long as wide at base. Lateral ocelli about their distance apart from margin of eyes and approximately same distance from occipital margin. Facial foveae punctiform. Face depressed, slightly ridged between antennae and very slightly convex from side to side below level of antennae. Mandibles very slender, evenly curved, simple and nearly reaching to base of each other. Proboscis moderately long, galeae about as long as stipites. Pterostigma and venation as in female.

Head and thorax shining, virtually impunctate, but frons minutely tessellate and slightly dullish. Pubescence whitish, very fine, thin and short. A few hairs on margin of mesoscutum, but face nearly bare.

Length, 3 mm; anterior wing, 2.9 mm; width of abdomen, 1.2 mm.

HOLOTYPE FEMALE AND ALLOTYPE.—41.8 km (26 miles) S of San Felipe, Baja California Norte, Mexico, 15 Apr. 1965 (D.

Q. Cavagnaro, C. E. and E. S. Ross, and V. L. Vesterby).

PARATYPES.—Four females, 14 males, collected with holotype and allotype, and four damaged specimens.

Types in collection of the California Academy of Sciences, San Francisco, except one pair of paratypes and two damaged specimens in collection of the University of California, Riverside.

#### SPHAERALCEAE GROUP

##### *Perdita apicalis*, new species

(Figures 11, 12, 13.)

Although the dorsal lobes of the caulis are somewhat produced as in *koebeleri* Timberlake, the general structural characters of both species are in agreement with the Sphaeralceae Group. In the key to this group (Timberlake 1964: 126–158), the male runs to couplet 188, but differs from *cushmani* Timberlake and *falcata* Timberlake in having the three apical segments of the abdomen testaceous, and the others mainly black, or sometimes marked with testaceous yellow. The subgenital plate (Fig. 13) of *apicalis* is very distinctive. The female runs in the same key (loc. cit.) to couplet 75, but differs from *dammersi* Timberlake and *obliqua* Timberlake in having the face and thorax mainly dark and the abdomen banded with white, but testaceous at apex.

MALE.—Head and thorax dark green, with anterior corners of cheeks, mandibles except at apex, and face below level of antennae yellow, except for intrusion of green between subantennal plates and lateral marks, with the last-mentioned marks ending acutely. Thorax entirely dark. Abdomen fuscous, with narrow apical depression of tergites 2 to 4 whitish subhyaline; three apical segments, entire undersurface, and apical margin of disk of tergite 4, testaceous. Tergite 2 with abbreviated and interrupted white line at base and, in one paratype, tergites 2 and 4 each with broad, testaceous yellow band extending bluntly to apex of disk and narrowed on each side by broad, oblique, fuscous band. Legs testaceous yellow, with front and middle femora behind, streak behind on their tibiae, hind femora and tibiae except in front, and hind tarsi fuscous. Scape of antennae yellow, flagellum duller yellow and mainly dusky above. Proboscis brownish testaceous, darker at base. Tegulae pale testaceous. Wings whitish hyaline, nervures pale testaceous, margins of clypeus and subcosta brownish.

Head as broad as long, cheeks receding and nearly as broad posteriorly as eyes. Posterior ocelli about three fourths of their distance apart

from margin of eyes and somewhat closer to occipital margin. Antennae inserted below middle of face, scape reaching nearly halfway to level of anterior ocellus, flagellum thickly cylindrical, with joints as broad as long. Antennal sockets their distance apart from margin of eyes. Frons almost plane; disk of clypeus as broad as high, rounded at summit, with lateral extensions broadly inflexed and not visible in frontal aspects. Extreme anterior corners of face also inflexed. Mandibles very acute and reaching for margin of labrum. Proboscis moderately elongate; galeae reaching base of stipites in repose. Pterostigma as long, and about three-fourths as wide, as first submarginal cell; marginal cell longer beneath than beyond stigma, with metacarpus subequal to apical truncation. Tarsal claws bifid.

Frons and vertex minutely tessellate, rather dull, and with dense minute punctures. Face below level of antennae shining, somewhat roughened by shallow punctures. Mesonotum polished and shining, with fine separated punctures. Mesopleura similarly sculptured. Pubescence whitish, erect, and rather dense on cheeks and sides of thorax, shorter on face above antennae, and thinner on mesoscutum. Abdomen about three times longer than wide, with subgenital plate and genital armature as figured (Figs. 11–13).

Length, 4.5 mm; anterior wing, 3.5 mm; width of abdomen, 1.5 mm.

**FEMALE.**—Head and thorax dark green, but face below level of antennae and labrum black, with at most small lateral marks or transverse lateral marks and median stripe on clypeus, white. Mandibles whitish, reddish on apical third. Thorax entirely dark. Abdomen testaceous beneath and on apical two segments, otherwise fuscous above marked with white. Tergite 1 with abbreviated and interrupted white line at summit of base declivity, and tergites 2 to 4 each with broad white band, nearly reaching lateral margins and almost as wide as dark intervals between them, with apical depression pale testaceous and subequal to light and dark bands. Legs dark, extreme apex of front and middle femora, together with anterior side of their tibiae, and tarsi yellowish white. Antennae dark, scape black, flagellum brownish and sordid yellowish beneath. Tegulae subhyaline testaceous. Wings whitish hyaline as in male.

Head rotund, as broad as long; cheeks strongly

receding, about half as wide as eyes. Posterior ocelli slightly more than their distance apart from nearest eye and occipital margin. Facial foveae about four times longer than wide, very close to margin of eyes and reaching about three fourths of distance from level of antennal sockets to level of anterior ocellus. Flagellum of antennae slightly clavate and rather thick, with joints mostly about as broad as long. Disk of clypeus much broader than high and rounded at summit. Mandibles reaching far margin of labrum, abruptly narrowed on inner margin, with formation of small inner tooth and very acute at apex. Proboscis and wings as in male. Pygidial plate narrowed from broad base to rounded apex, with disk plane.

Frons and vertex minutely tessellate and dull, with minute punctures nearly to level of ocelli; face below level of antennae shining, with close shallow punctures. Thorax polished, with punctures of mesonotum numerous but mostly well separated, and puncturation of mesopleura similar. Pubescence whitish, fine, erect, dense and long on cheeks and sides of thorax, rather dense on face above antennae and thin on mesonotum. Apical fimbria of abdomen long but thin. Scopal hair of hind legs more than twice as long as greatest width of tibia.

Length, 5 mm; anterior wing, 3.5 mm; width of abdomen, 1.6 mm.

**HOLOTYPE MALE AND ALLOTYPE.**—41.8 km (26 miles) S of San Felipe, Baja California Norte, Mexico, 15 Apr. 1965 (D. Q. Cavagnaro, C. E. and E. S. Ross, and V. L. Vesterby).

**PARATYPES.**—One female, two males, same data as for holotype and allotype.

Types in collection of the California Academy of Sciences, San Francisco, except one paratype in collection of the University of California, Riverside.

### *Perdita bifasciata*, new species

(Figures 14, 15, 16.)

In the key to Sphaeralceae Group (Timberlake 1964: 126–158), this species runs to *zebrata* Cresson in couplet 228 and is very distinct in the markings and terminalia.

**MALE.**—Head and thorax dark blue-green, mesonotum black. Mandibles light rufotestaceous; labrum, face below level of antennae with lateral marks extending to level of ocelli, anterior part of undersurface of head and posterior orbits to middle of eyes, yellow. Pronotum dark on disk, but hind margin confluent with mark on flanks, and tubercles yellow, but median dark lobe from disk descending halfway on flanks.

Prosternum yellow except lateral margins, and mesosternum with yellow mark on each side anteriorly. Thorax otherwise dark. Abdomen fuscous, with even, narrow yellow band at base of tergites 2 and 3, that on tergite 2 touching lateral foveae, other reaching lateral margins of segment. Venter of abdomen testaceous yellow. Front and middle legs, apex of hind tibia, basal half of hind femora with entire underside yellow, but front femora black behind except at apex and front and middle tibiae dark on posterior margins. Antenna yellow, flagellum tinged with fuscous. Tegulae testaceous. Wings nearly clear hyaline, nervures testaceous, margins of stigma and subcosta dusky.

Head somewhat broader than long, cheeks moderately receding, rounded and about half as wide as eyes. Antennae inserted below middle of face, scape about four times longer than thick, flagellum nearly cylindrical with joints about as long as thick. Face convex from side to side with disk of clypeus broader than high and well rounded at summit. Mandibles tapering, acute and reaching far margin of labrum. Proboscis moderately long, galeae equal to stipites. Pterostigma four times longer than wide and hardly more than half as wide as first submarginal cell; marginal cell equal beneath and beyond stigma, with metacarpus distinctly longer than apical truncation.

Head and thorax shining, minutely tessellate on frons, vertex and thorax, and with very minute and sparse punctures. Face below level of antennae polished and impunctate. Pubescence whitish, long, fine and moderately dense on sides and underside of thorax, thin on face and thin, short and erect on mesonotum.

Length 5.5 mm, anterior wing 3.2 mm, width of abdomen 1.5 mm.

**HOLOTYPE MALE.**—Southwestern Research Station, 1646 m (5400 ft), 8 km (5 miles) W of Portal, Cochise County, Arizona, 11 Sep. 1965 (P. H. Arnaud, Jr.).

**PARATYPE.**—One male (abdomen missing), same data as for holotype.

Types in collection of California Academy of Sciences, San Francisco.

### ***Perdita perlucens*, new species**

The female of *perlucens* is similar to *lucidella* Timberlake (1964: 204–205) in size and color, but has the face much more punctured, the facial foveae much larger, the pterostigma more slen-

der, the marginal cell longer, with the metacarpus twice as long as apical truncation and the pygidial plate broader.

**FEMALE.**—Head and thorax very dark blue, with clypeus and supraclypeal area black, and no light markings. Abdomen blackish, unmarked; pygidial plate testaceous. Legs dark, anterior side of front tibiae testaceous yellow, tarsi testaceous. Scape of antennae black, flagellum fuscous above and brownish beneath. Labrum and mandibles testaceous, with apex of mandibles darker. Tegulae testaceous. Wings slightly dusky hyaline, nervures and margins of stigma testaceous, subcosta darker.

Head distinctly broader than long; cheeks strongly receding and about half as wide as eyes. Posterior ocelli only slightly more than their distance apart from margin of eyes and occipital margin. Facial foveae oval, twice as long as wide, or slightly more, close to margin of eyes and reaching from level of antennal sockets about two thirds of distance to level of anterior ocellus. Antennae inserted below middle of face, flagellum slightly clavate, with middle joints as wide as long. Disk of clypeus much broader than high, rounded at summit, with lateral extensions broadly inflexed. Mandibles simple. Proboscis moderate in length, not exceeding fossa in repose. Pterostigma only slightly more than half as wide as first submarginal cell; marginal cell as long beneath as beyond stigma, with metacarpus nearly twice as long as apical truncation. Pygidial plate plane with lateral margins converging to rounded apex.

Head and thorax mainly polished and shining, but anterior half of frons minutely tessellate and, together with face below level of antennae, very closely and minutely punctured, except punctures of clypeus distinctly larger. Punctures of mesonotum sparse, but more numerous on anterior border. Pubescence white, rather short and dense on cheeks, longer on underside of thorax, and short and thin on face and mesonotum. Scopal hair of hind tibiae about twice as long as greatest width of tibia.

Length, 4 mm; anterior wing, 3 mm; width of abdomen, 1.2 mm.

**HOLOTYPE FEMALE.**—Mammoth Lakes, Mono County, California, 5 Aug. 1936 (Ruth and G. E. Bohart).

**PARATYPE.**—Six females, taken with the holotype.

Types in collection of the California Academy of Sciences, except one paratype in the collection of the University of California, Riverside.

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